XIV. *A New Family of* Lepidoptera, *the* Anthelidae. By A. Jefferis Turner, M.D., F.E.S.

[Read October 15th, 1919.]

The Australian moths belonging to the genus *Anthela* and its allies have given some trouble to systematists. Usually, I think, they are regarded as a part of the family *Liparidae* (*Lymantriidae*), and they have been so arranged by Sir George Hampson in the collection of the British Museum. Until recently I concurred in this opinion, but, recognising that they showed certain peculiarities, I treated them as a separate subfamily, the *Anthelinae* (Trans. Ent. Soc., 1904, p. 469). For this view there appeared to be sufficient justification, for they agree with the rest of the *Liparidae* (as generally known) in the absence of a proboscis, in the neuration of the hind-wings, in the fore-wings having vein 5 arising from near the lower angle of the cell, and in the presence of an areole. The areole is present in the more primitive genera of the *Liparidae*, though many have lost it. In the *Anthelidae*, however, the areole is always present, and shows important structural peculiarities.

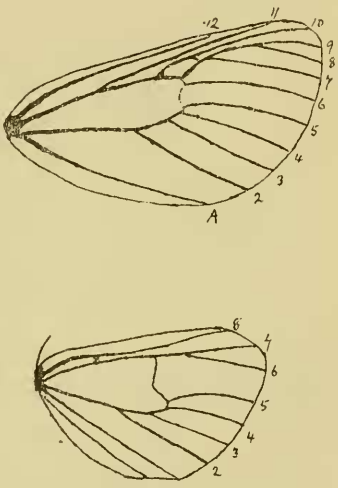

Fig. 1.—*Ladia obsoleta* Fab.

The accompanying figure shows the neuration of one of the more primitive genera of the *Liparidae*. It will be noted that it shows the presence of an areole typically formed, from which arise vein 10 by a separate stalk, and 7, 8, 9 by a common stalk. This structure occurs also in other families, such as the *Arctiadae*, *Noctuidae*, *Notodon-*

tidae, and *Geometridae*. Compare with this the neuration of *Anthela ferruginosa* Wlk. (fig. 2). The peculiarities of

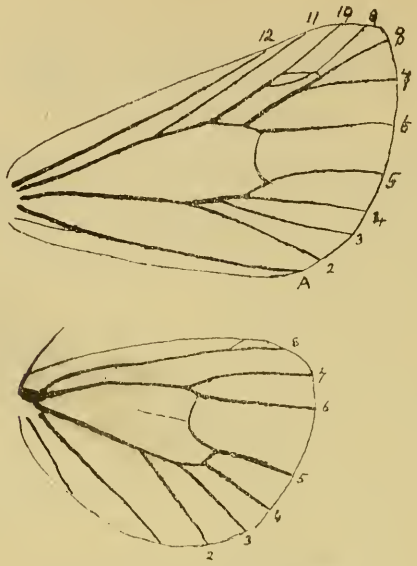

Fig. 2.—*Anthela ferruginosa* Wlk.

the areole are at once apparent. This is very elongate, all the veins 7, 8, 9, 10 arise from it separately, and a triangular

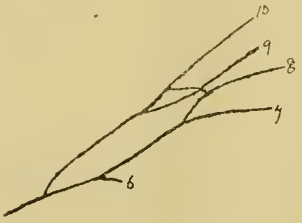

Fig. 3.—Areole, *Anthela ferruginosa*.

portion at the apex appears to be cut off by a cross-vein (fig. 3). This triangular portion is not always evident. In fig. 4 are parts of the fore-wing of two individuals of *Anthela acuta* Wlk. In one the triangle is very minute,

in the other absent, having evidently been lost by the coalescence of the cross-vein with the wall of the areole.

How can this peculiar structure be explained? Some light is thrown on it by the fore-wing of *Chelepteryx collesi* Gray. In this very large moth—it expands 140 to 170 mm.—it is evident that veins 10 and 9 are normally stalked, while 9 soon after its origin is connected by a short cross-bar with 8, so forming the areole. An oblique cross-vein formed by a strong chitinous ridge arises very near 11, runs across 10 and 9 after their bifurcation, and ends on the cross-bar, which connects 9 and 8. The use of such a structure in this large unwieldy insect is evidently to strengthen the

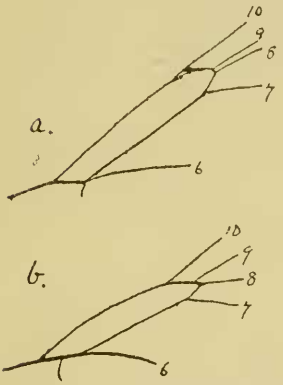

Fig. 4.—Areole, *Anthela acuta* Wlk.

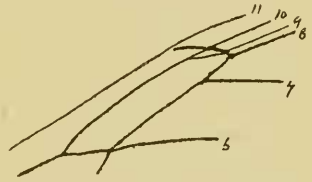

Fig. 5.—Areole, *Chelepteryx collesi* Gray.

apical part of the fore-wing. It is an adventitious development, and forms no part of the true areole.

In an archaic genus from Queensland hitherto unnamed, which I name *Gephyroneura*,* there is a similar bar running from 11 across vein 10, but here the original structure has been obscured by the partial loss of the areole, by the coalescence of 10 with the chorda, so that 7, 8, 9, and 10 are long-stalked from the upper angle of the cell. The distal extremity of the areole is, however, preserved as a small triangle from which the veins 7, 8, 9, and 10 arise separately. Extremely similar to *Gephyroneura* in appearance and closely allied to it is *Munychryta* Wlk. Here the areole is preserved, but the oblique cross-bar from 11 has fused with

* γεφυρονευρος, with bridged veins.

its apical wall. *Munychryta* is remarkable for the development of a strong spiral proboscis, which is completely absent in all the preceding genera. Both *Gephyroneura* and *Munychryta* are of comparatively small size (25 to 35 mm.), and possess a strong basal costal expansion of the hind-wing, similar to that found in the *Lasiocampidae*, but with a strong frenulum present in the ♂. In the only ♀ (*Munychryta* sp.) that I possess the frenulum appears to be absent.

The *Anthelidae* are an Australian family. So far as known no species occurs outside the Australian region. A few species of *Anthela* are known from New Guinea.

I interpret these facts as follows. In the primitive Lepidoptera Heteroneura all the veins from the areole arose separately, the areole being completed by a short cross-vein running from 9 to 8, as occurs in the more primitive

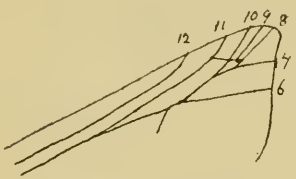

Fig. 6.—Apex of fore-wing, *Gephyroneura* sp.

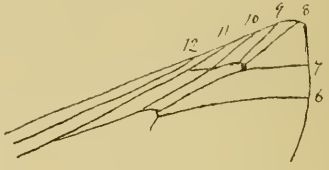

Fig. 7.—Apex of fore-wing, *Munychryta senicula* Wlk.

Cossidae. With more active habits of flight in large-winged moths a necessity arose for strengthening the scaffolding of the apex of the fore-wing. This was attempted in two ways, by a lengthening of the areole, and by an approximation of the veins running from the areole towards the apex, with a coalescence of their stalks. Both changes may be observed in the neuration of the *Cossidae* (Trans. Ent. Soc., 1918, p. 155). In the more specialised families one of these lines of evolution was followed to the exclusion of the other. In most as in the *Liparidae* there was stalking of the radial veins, the areole remaining short, and tending to dwindle and disappear. In the *Anthelidae*—and this is the justification for regarding them as a distinct family—the veins remained separate though approximated as the areole grew longer. The ancestral *Anthelidae* I imagine to have been moths of large size, like *Chelepteryx* or larger, and in them this mechanism was not sufficient to give the necessary strength. As a consequence a strong oblique

chitinous bar was developed near the apex, forming a cross-vein running obliquely from 11 across 10 to 9. With diminution of size, or more sluggish habits, or both, this cross-vein has tended to disappear, but in two archaic genera *Gephyroneura* and *Munychryta* it has been preserved in spite of great reduction in size.

So far as I know, the only other family possessing a similar areole, which, however, may not be an homologous development, is the *Cymatophoridae*, and with these the *Anthelidae* cannot be allied, the differences between the two families being very great in other respects.

Note.—In the hind-wing of *Anthela ferruginosa* (fig. 2) the subcostal vein is forked. This is an individual peculiarity of the specimen figured, but important, as it goes to prove, what I have previously suspected, that the subcostal is a composite vein. The first radial runs into the subcostal in the hind-wing in many genera of many families, but this is the first instance I have observed, in which it separates again.